JEPPESEN INSTRUMENT/COMMERCIAL MANUAL

Aantekeningen Theorie IF

Sector 2B

Attitude Instrument Flying

Flight Instruments	Gyroscopic	Attitude Indicator	
		Heading Indicator	
		Turn Coordinator	
	Instrument Scanning	Interpretation	Cross check when faulty
	Usage Errors >	Fixation	
		Omission	
		Emphasis	

Instrument Errors

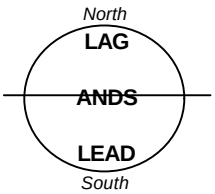
Blocked Pitot	Airspeed	Reaction as Altimeter	
		Highered in Climb, Lowered in Descent	
Blocked Static	VSI	Remains at Zero	
	Airspeed	Lowered in Climb, Highered in Descent	
Alternate Static	Altimeter	Reads Higher	
	Airspeed	Reads Higher	
	VSI	Indicates Climb	

Airspeed	IAS	on airspeed indicator	
	CAS	correction for position installation error	
	TAS	correction for temp/alt	
		at 200kts or lower > per 1000ft altitude, CAS +2% = TAS	

Altitude	Air temperature higher than standard > altimeter indicates lower than true altitude		
	Pressure Decrease	Cold Air (most)	
		Warm Air (least)	
		Warm > Cold = Indication Lower > Higher than True Altitude	
	Pressure Setting	Twist from Higher > Lower QNH Setting on Altimeter	
		> Altitude Indication will be Lowered	
	General	*High > Low, Look Below*	
	Obtain Pressure Altitude = Set altimeter to 29.92 inch		
	Standard Pressure Lapse Rate = 1 inch per 1000ft		
	Reading Altimeter	Long Hand = 100's feet	
		Small Hand = 1000's feet	
		Thin Hand = 10.000 feet	

Magnetic Compass

Variation	West = + (west is best), East = - (east is least)		
Compass Errors	LAG = Turns Through Northern Compass Side		Not valid to/from East/West Heading
	LEAD = Turns Through Sourthern Compass Side		Not valid to/from East/West Heading



UNOS	Undershoot North, Stop Turn Before HDG	
	Overshoot South, Stop Turn After HDG	
	Latitude 20° = 20° Correction	
Acceleration ANDS	on E/W Heading	
	Acceleration = North Turn Indication	
	Desceleration = South Turn Indication	

Attitude Indicator

Error after rollout of	180° Turns	Indication of Slight Climb + deviation in opposite direction
	180° Skid Turns	Indication to Opposite Direction
	360° Turns	No error
Error due speedchange	Accelaration	Horizon plane moves Down
	Descelaration	Horizon plane moves Up

Attitude IF

Pitch Instruments	Attitude Indicator / Altimeter / Airspeed Ind / VSI
Bank Instruments	Attitude Indicator / Heading Indicator (DG) / Turn Coordinator
Power Instruments	Manifold Pressure Gauge / Tachometer / Airspeed Ind

Primary Instruments	During maneuvres keep instrument on constant indication
Supporting Instruments	During maneuvres for helping maintain desired indication

	Primary	Supporting
Level Flight	Alt / DG / Airspeed	VSI / Attitude
Standard Turn	Alt / Turn Coord	VSI / Attitude
Climb	DG / Airspeed	Attitude / Turn Coord
Descent	DG / VSI	Attitude / Turn Coord
Speed Change	Alt / DG / Manifold	Attitude

Attitude Indicator	Primary during Transitions, Supporting during Stability	
Altitude Correction	Correction < 100ft	Half Bar Pitch on Attitude Ind
Instrument Failure	Vacuum Pump	Att/Heading are conflicting Other instruments then leading
	Attitude Indicator	Bank + Others are leading
	Heading Indicator	Check with magnetic compass Alternative: Timed Turns > 3° p/sec, 45° p/15 sec
Control / Performance	Attitude Indicator is leading, other instr one by one Power set for maneuvres	

Sector 2C

Instrument Navigation

	HSI components	Compass Magnetic Heading Course Arrow (selecter) Glide Slope Indicator Heading Index (curr heading: lubberline) Course Deviation Bar (2° of track / per dot) TO / FROM Arrow
	Radial Interception	Visualize present position and where to go Select heading to intercept Tracking Wind Correction, double corr angle (10/20)
	Time to VOR Station	Time (10° passage) x 60 / Degrees bearing change = time (min)
	Cone of Confusion	No more than 5° correction, hold last heading

0.5Nm from station	12sec (at 100kts)
3.0Nm	35sec
10Nm	140sec

	ADF Navigation	L/MF NDB, relative bearing: Nose/Station angle Magnetic Bearing TO Station MH + RB = MB (TO)
	Radio Magn Indicator	ADF on a slaved compass Single and Double Arrow = NDB/VOR switched
	DME	Slant Range Distance till 199Nm at 1000ft min

Distance	6000ft = 1Nm
Errors	At high altitude above station
Accuracy Valid	From station 1+ Nm for each 1000ft altitude
Check VORDME	DME portion every 30sec identification

	DME Arc	Enroute > Approach fase RMI or ADF to wingtip After segment begin inbound approach Windcorrection	
	ILS	OM	Blue Light, -- -- --
		MM (200ft)	Amber Light, -- . -- . --
		IM	White Light, ...
		On Localizer no driftcorrection >2°	
		GS At OM	420 feet vertical deflection 2 dots
		GS At 1.9Nm	140 feet vertical deflection 2 dots
		LOC At OM	1550 feet horizontal deflection 2 dots
		LOC At 1.9Nm	710 feet horizontal deflection 2 dots
		DME	Channel Information in box
	VOR/VORTAC	(T) Terminal	Service Volume Radial of 25Nm * 1000 - 12000ft
		(L) Low Altitude	Service Volume Radial of 40Nm * 1000 - 18000ft, (max 80Nm apart off route)
		(H) High Altitude	Service Volumes * 1000 -14500ft Radial of 40Nm * 14000-18000ft Radial of 100Nm * 18000-45000ft Radial of 130Nm (max 200Nm apart off route)
		Course Dots on Scale	Per Dot 2° of deviation, Max 5 Dots each side Per Nm > 200ft per Dot off track (6000ft = 1Nm) 1 Dot at 30Nm, 200 x 30 = 6000ft
	VOR Checks	IFR: tested in last 30 days period VOT: Test facility on ground, on 360 radial with FROM indication Max 4 + 4° error on Ground and Air 2 rcvrs, Air with 1 receiver +/- 6° Test: 0° on FROM indication, 180° on TO indication Results in logbook (date/place/error/signed)	
	RNAV	Area Navigation, route via geographical waypoints	
	GPS	Approach: when RAIM (receiver autom integrity monitoring) test is passed, safe operation, if not then other navigation	
		Bearing	Track from present pos to wp
		TRK	Current track
		DTK	Desired track (to intercept)

Sector 3A

Airports, Airspace + Flight Information

Runways	Visual	Only numbers on RW	
	Non Precision Instr	No glideslope, visual RW markings (treshhold/aiming)	
	Precision Instr	ILS, Visual clues, treshhold/touchdown zone	
Taxiway	Center	Marking by yellow line	
	Holding	Line between Ground and Tower responsability	
		Holding Point Types:	Standard
			ILS Holding (signal interference)
LAHSO	Landing and Hold-Short Operation	Clearance to land/hold short of intersecting (crossed) runways (pilot responsability)	
	ALD	Available Landing Distance (found in Airport Facility Directory)	

Approach Lighting Sys	Purpose:	Transition form Instrument > Visual Reference
	Types:	SFL, Sequenced Flashing Light (travelling light)
		RAIL, Runway Alignment Indicator Light (travelling light)
		REIL, RW End Indentifier Light, strobes at TRHLD
	Red over Red = You're dead	VASI, Visual Appr Slope Indicator, 1st white, 2nd red,
		VASI, 3-bar/3-light, high or low cockpit (WWR/WRR)
		VASI, 3-Color, Amber/Green/Red, 1-light system
		PLASI, Pulsating Light Appr Slope Ind., red/white low/above
		PAPI, Prec. Appr. Path Ind, 4 red/white lights (hor.)
		LIRL, Low Intensity RW Lights (MIRL/HIRL)
		MALS, Medium Appr Lighting Sys (MALSF, seq flashing lghts)
		ODALS, Omnidir Appr Lighting System
	High Glidepath	> 3.5°
	Slight High Glidepath	3.2°
	Low Glidepath	< 2.5°
Airspace IF Based	Class A	From 18000ft AGL and above (FL600)
		Altimeter: 29.92 (FL)
		IFR Only, FPL required, ATC Clearance
	Class B	Busy airports
		Surface > 10000ft MSL, 2 or 3 layers
		ATC Clearance + Mode C/VOR (30Nm rad)
		VFR Corridors
	Class C	2 Circular layers, outward 5 and 10Nm radius (<4000ft)
		Sattelite AP clearances via radio ATC
		Mode C (also above) + radio contact
	Class D	2-Way radio ATC
		Class D when tower is operative
		Max 2500ft MSL (in 100's of feet)
	Class E	14500ft > 18000ft MSL
		Mode C at 10000ft MSL and above
		VFR till FL180
		Federal Airways (V-Airways), VFR/IFR between navaids (1200>18000ft)
	Class G	Uncontrolled by ATC
		At 700 or 1200ft AGL or 14500ft MSL
Airspace & Visibility	B-C-D	3 sm *(3-152)*
		1000ft above / 500ft below / 2000ft horizontal
	E (<10000ft)	3 sm *(3-152)*
		1000ft above / 500ft below / 2000ft horizontal
	E (>10000ft)	5 sm *(5-111)*
		1000ft above / 1000ft below / 6000ft (1 sm) horizontal
	G (<1200ft)	Day: 1 sm
		Clear of Clouds
		Night: 3 sm *(3-152)*
		1000ft above / 500ft below / 2000ft horizontal
	G (>1200ft)	Day: 1 sm *(1-152)*
		1000ft above / 500ft below / 2000ft horizontal
		Night: 3 sm *(3-152)*
		1000ft above / 500ft below / 2000ft horizontal
Special Use Airspace	Prohibited Area	OK
	Restricted Area	OK
	Warning Area	Potential danger outward coastarea 3Nm
	Alert Area	Areal activity
	Mil Operations	MOA, separate military from IFR traffic (cleared)
		VFR should contact ATC (FSS)
	Controlled Firing	Not displayed on chart
	National Security	Increased security (NOTAM issued)
	ADIZ	Air Defense Identification Zone, FPL for ID
		when entering US airspace

Flight Information	Airport Fac. Directory	Regional books with public airports, ATC
	Aeron. Inf. Manual	VFR/IFR procedures/services etc
	NOTAM	Time critical; D (distant), L (local) in FSS area
	Intern. Flight Inf. Manual	For flights outside USA
	Advisory Circulairs	References for practical operations (tips)

Sector 3B

Air Traffic Control System

ARTCC	Air Route Traffic Con.Ctr	Authority for IFR clearances
		Monitoring IFR flights enroute
		Coordination/Seperation
		Safety Alerts
		Eemergency Assistence
	Airspace:	Sector Devided, Lateral/Vertical
	Part:	Center Weather Advisory CWA
	Call	<NAME> Center

Flightplan	Submitted at FSS or TWR (via phone/radio)
	At least 30min before departure
	Distributed via ARTCC network
	Clearance by Delivery, if no TWR than phone/radio (1-800-WXBRIEF)

Terminal Facilities	ATIS
	Clearance Delivery
	Control Tower
	Approach/Departure Coordination into ARTCC

FSS	Flight Service Stations	IFR/VFR
		Weather/Flightplans
		Local Airport Advisory
		No heading corrections for wind
		Call: <NAME> Radio
		Freq: 122.2 / 121.5

Terminal Radar	Separation between IFR and VFR Traffic

Terminology	Resume Own Navigation	Own navigational responsability by pilot
	Radar Contact	Aircraft indentified flight following provided

No Alternate on FPL	AP With IAP: if on Destination Cloudbase >2000ft, Visibility >3 sm
	1 hour before / 1 hour after ETA

Standard Alt Selection	Precision Approach:	>600ft, 2 s.m.
	Non-Precision Appr:	>800ft, 2 s.m.
	Without IAP: Must allow descent from MEA under VFR	

Sector 3C

ATC Clearances

Elements	Clearance Limits like	Waypoint restricted
		ShortRange only
	Phrase:	*Expect further clearance at TIME*
	Departure Procedure	Heading/Altitudes
	Route of Flight	Different Routes or FLs
	Altitude Data	Cruise clearance
	Holding Instructions	When delays are expected
	Special Info	
	Freq/Transponder Info	

VFR on Top	On pilots request VFR conditions with VFR cruising levels Not in class A VFR Levels based on magenetic course: *0° - 179° > odd 1000's + 500 (oost is oneven) (e.g. 9500ft)* *180° - 359° > even 1000's + 500 (e.g. 10500ft)* Request by radio or FPL ("VFR on Top" statement) IFR (flightplan) + VFR, requested ATC clearances See and avoid other aircraft by pilot		
Approach Clearance	Circling Approach Clearance Contact Approach, short-cut (on req), min 1 s.m. Visual Approach (VMC: 3 s.m. or more)		
Cruise Clearance ALT	Choose any altitude from MEA to ALT On pilots discretion		
Climb Clearance	Use optimum climb to 1000ft under assigned ALT, then climb 500-1500ft/min Conversion Tabel: ft/nm > ft/min (Rate of Climb)		
Composite FPL	IFR with VFR segments	Contact FSS enroute for activation or closure	
Departure Restrictions	Release Time Clearance Void Time	earliest time for departure (hold for release) by ATC expected time to be departed	

Sector 4A

Departure

Published by	Jeppesen (worldwide) National Ocean Service (NOS) Atmosperic Administration	
TERP	US Standard for Terminal Instrument Procedures Items:	Obstacle Clearance Climbrate >200ft/Nm Take Off: at least 35ft above End of Runway
DP	Instrument Departure Procedure, Transition Airport > Enroute segment DP Chart: Check table req Climbrate ft/min related to Groundspeed	
DP Charts	Pilot NAV DP Vector DP	Navigation by pilot Initial instruction to Radar Control

Sector 4B

Departure Procedures

Take Off Minimums	Single / Twin Engine	VMC: 1 s.m.	FAR Part 97
	Twin / More Engine	VMC: 1.5 s.m.	(1600ft = 1/4 s.m.)
	Prevailing Visibility	Greatest distance of visibility for half the horizon (METAR Info)	
	Runway Visual Range	Pilot Visibility on runway	Touchdown RVR Mid Runway RVR Roll Out RVR
	Runway Visability Value	Via transmissometer determined visibility for spec runway	
Departure Options	Graphic Instrument Departure Procedure Textual DP (minimal) Radar DP VFR DP		Choice depending on circumstances/airplane

Sector 5A

En Route + Area Charts

En Route Charts	Complexity of Airway System		
	Dipicting Safe Altitude		
	Ensure Signal Reception		
Area Charts	Displays Terminal Area in detail		
	Usage during Transition Enroute <> Terminal Area		
Low Altitude ER Chart	Below 18000ft MSL (V-Airways)		
High Altitude ER Chart	18000ft and up to FL450 (Jetroutes)		
Enroute Navaids	VOR		
	TACAN (Civil DME only)		
	VORTAC (VORDME)		
Victor Airways	V = VHF Airways		
	Via VOR/VORTAC navaids		
	Airway East - West = Even Numbered		
	Airway North - South = Odd Numbered		
	Width: 4 + 4 Nm		
	Airspace: Class E		
Low Freq Airways	Via NDB's		
Airways General	Dimensions: Width = 4+4Nm, 1200ft to 18000ft		
	Symbols	X = Milage Breakpoint, Course change	
		△ Intersection, Non-Compulsory Position Reporting Point	
		▲ Intersection, Compulsory Position Reporting Point	
Symbols	10000	MEA	
	*7100	MOCA (with * or T)	
	X	MCA, must be reached when being crossed, Stated in attached Label	
	7000 →		
	← 6500	Direction Related altitudes	
	(H)	HIWAS, Hazardous Inflight Weather Adv Services	
	70	Distance (total) between Compulsory Reporting Waypoints	
	(L)	Airfield/RW Pilot Controlled Lightning	
Altitudes	MEA	Minimum Enroute Altitude	Lowest Altitude on segment between fixes Signal reception assured Obstacle Clearance (2000ft)
	MSA (airport)	Min Safe Altitude	Ensures 1000ft Clearance in 25Nm radius
	MOCA	Min Obstacle Clear. Alt.	Within 22Nm from navaid
	MORA	Min Off Route Altitude	1000ft above highest manmade obstacle Mountains: +2000ft + 4Nm from Course Big numbers on chart
	MAA	Max Authorized Alt.	Routesegment alt. for single freq reception of navaid (line of sight)
	MRA	Min Reception Altitude	Lowest altitude for reception of signal
	MCA	Min Crossing Altitude	MOCA with climb before MCA fix (mountains)
	COP	Change Over Point	Freq change between navaids
VOR Signal Reception	At MOCA within 22Nm from Navaid or is reliable at MEA Off Airway max 80Nm between VOR's		

FSS Frequency	Normally 122.2 and 121.5 (bold-shaded box)	
	Other frequency above Box	
	VOR Frequency 118.6 = No Voice on frequency	
Communications	FSS	Flight Service Station
	EFAS	Enroute Flight Advisory Service (Area) (122.0 Mhz below FL180)
		Call: <NAME> Flight Watch, (weather info)
	ARTCC	Air Route Traffic Control Center (blokkartel lijnen)
	RCO	Remote Communication Outlet, Controlled by FSS
Airports	With Instrument Appr	Blue and Capital Letters (Jeppesen)
	Non-Instrument	Green and Upper/Lower Case letters

Sector 5B

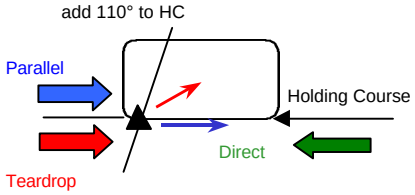
Enroute Procedures

Reporting Procedures	Non-Radar	Every Enroute Waypoint
		Performance change (Speed 5% or 10kts, >500ft/min)
		Altitude Changes
		ETA Changes (~ 3min)
		Reach Holding Fix
		Leave Holding Fix
		Outer Marker
		Missed Approach
		Approaching Clearance Limit
		Equipment Failure
		Unforcasted Weather
	Compulsory Reports	Over VOR's and Intersections
	Items	*Identification*
		Position / Altitude
		IFR / VFR
		ETA next Fix > ETA second Fix
		Remarks
Radio Failure	Leave Fix at EFC or Close to ETA	
	En Route: Highest Altitude	
IFR Cruising Altitudes	Assigned by ATC	
	Based on magnetic course (0-179 = ODD) (e.g. 9000)	
	Altimeter on QNH below 18000ft (req with FSS <100Nm)	
	Altimeter on 29.92 above 18000ft (FL)	
IFR Descent	Clearance	when req, prompt descent with 500-1500ft/min
		report leaving/maintaining altitude
	On Pilots discretion	Start whenever pilot chooses
		Leaving means no return

Sector 5C

Holding Procedures

Standard Pattern	Oval Racetrack	
	Turns to Right	Left = Non-Standard
	Below 14000ft MSL	2 x standard rate 180°, 1-minute legs
	Above 14000ft MSL	2 x standard rate 180°, 1.5-minute legs
	Inbound / Holding Course	Towards Fix (navaid or DME distance)
	Holding Side	Side where holding is flown
Wind	Upwind/Downwind corr	1min / 45sec - 1min / 1.15min
	Crosswind corr	WCA Inbound = 3 x WCA for Outbound
Speed	6000ft or below	200 KIAS Max
	6000-14000ft	230 KIAS
	14000ft and up	265 KIAS
Entries	Direct	Sector 180° at Holding Side
	Teardrop	Intercept 30°, 1-minute leg
	Parallel	At non-hold side, left turn
	Rule for Direct	When HC is behind at fixposition
	Rule for Teardrop	When HC is Ahead and Right
	Rule for Parallel	When HC is Ahead and Left
Holding ATC	Expect Further Clearance at TIME (EFC)	



Sector 6A

Arrival

Arrival Chart

Approach Plate	Frequency Options	119.05 (east)	Coming from easterly direction
		125.80 (west)	Coming from westerly direction
Communications	ATIS	Updated upon receipt of official weather	
		Omitted items, Ceiling > 5000ft, Visibility >5SM	
	Descent Clearance	On Segment of Published IAP	
		Approach/Localizer only with ATC clearance	
STAR	Standard Terminal Arrival Route		
	Functions	Enroute segment > Terminal Area and Instr/VIsual Approach	
		Simplify complex clearances and freq congestion	
		Starts at common Navaid or Intersection	
		Initial Fixes on STAR correspond with Enroute Charts	
		Routes contain: Course, Distance, MEA, Speeds	
	Vertical Nav Planning	Establish efficient descent for High Performance Aircraft	

Sector 6B

Arrival Procedures

Functions	Preparation before Approach Fase STAR filed in FPL or additional Clearance by ATC No acceptance: NO STAR in Remarks section MCA is not a part of ATC clearance
Preparation	Listen to ATIS Monitor AWOS, ASOS, FSS
Review the Approach	ATIS Radio / Nav Frequencies (identification) Inbound Course Descent Minimums Missed Approach / Time to MAP Min Safe Altitude Approach Checklists Preland Checks ATC Clears for Altitudes, Airspeed (if comply max 10kts dev), amendments, cancellations

Sector 7A

Approach

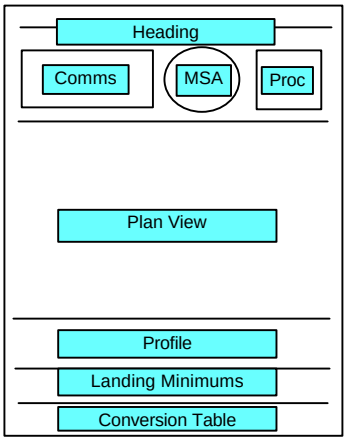
Approach Chart

Instr. Appr. Procedure	(IAP) From Enroute to Starting Point at Destination Airport	
	Precision Approach	Vertical/Horizontal Guidance (ILS/Glideslope)
	Non Precision Appr.	VOR/NDB, No Glideslope
Approach Segments	Initial	Initial Appr Fix **(IAF)** to Intermediate Fix **(IF)** Purpose: Alignment aircraft with approach course How: via DME Arc, Course Reversal, Procedure Turn
	Intermediate	IF to Final Approach Fix **(FAF)** Purpose: Positioning for Final Descent How: with 30° alignment to Final Appr Course (FAC) Reducing Airspeed, Before Landing Checklist, Downwind checks
	Final	FAF to Missed Approach Point **(MAP)** Purpose: Navigate safely to Visual References for Landing Cues must be visible at MAP a) Precision: Starts at Intercept Glideslope at Minimum Glideslope Intercept Altitude b) Non-Precision: Starts at FAF on FAC or where VOR/NDB radial intersects with FAC
	Missed Approach	MAP back to Initial Approach Fix Purpose: Navigate from MAP to IAF or IF a) Precision: MAP is at Decision Height (DH) b) Non-Precision: MAP is at defined Fix from Navaid
Chart Symbols		Minimums not Standard Departure is Published
		Alternate Min Not Standard
		Indicates FAF for Precision Approach
		Indicates FAF for Non Precision Approach

Approach Chart Layout (Jeppesen)

Heading Section

City + Airportname
Instrument Approach Title
Primary Appr Facility
Comms Frequencies
Min Safe Altitude (1000ft above Obstruction within 25Nm radius)
Procudure Title (Type/Req Equipment) (VOR/A = no straight in)
Chart Index Nr. > XX-X (airpnr in same area/chart type/index chart w/same appr)
Charttype: 0=Area/STAR//DP, 1=ILS/LOC, 3=VOR/DME, 6=NDB



Contents Heading Section

Communications	Approach/Tower/Ground
	ASOS
	Radar (y/n) (R)
	Alternate Frequencies
Dates	Effective date
	Chart date
MSA	1000ft Clearance on highest obstacle in 25Nm radius of facility

Contents Plan View

Overhead Presentation of Approach
Procedureturns/Patterns/Non-Course reversal
Highest Reference Point (nr with arrow)
OM/MM, Outer Compass Locator (LOM)
Feeder Routes (thin arrow)
Marker Beacons (lens shaped)
Missed Approach Track
Navaid box with DME (D), High Alt DME (H)
Oval Shape = ILS/LOC/LDA/SDF, Shadowed=Primary

Contents Profile View

Approach from the side, Height Path
IAF/FAF, (x)=non-precision FAF (alt)
TDZE, Touchdown Zone Elevation
HAT, Height Above Touchdown (real height)
> DA(H) 489'(200')
TCH, Treshold Crossing Height, GS height above THD
FAF, ILS intercept point
Distances (Nm) OM - MM

Stepdown Fix	Descent to lower altitude after FAF and MAP
VDP	Visual Desc. Point, by letter "V" for normal landing Runway in sight starting form MDA.

Landing Minimums

Minimal Visibility and Altitude
Specified for each approach

Aircraft Appr Catagories — 1.3 x Power Off Stall Speed in Landing Configuration at max grossweight

A Up to 90kts (approach speed)
B 91-120kts
C 121-140kts
D 141-165kts
E 165+ kts

B-Type (120) + 5kts (inc)= C Catagory (example)

	Minimum Descent Req	Section: Landing Minimums
	DH:	Decision Height (MSL)
	DA(H)	Decision Altitude (Height) (MSL)
		Point in Approach to decide Land or Missed Appr
	Visibility Requirements	Stated in s.m. or 100s of feet
Landing Minimums	840/24	MDA / RVR (2400ft)
		RVR 24 = 0,5 s.m.
	Inoperative Components	Minimums will increase
		ILS I/O > Localizer Minimums

Airport Chart

Diagram (sketch)	Ground movements, on reverse side of 1st appr chart	
Airport Chart	Heading Section	Location/Elevation/Variations
		Comms Frequenties
	CTAF	Common Traffic Advisory Freq.
	Plan View + Add. Info	Overhead View
		Runways/Lighting Systems
		Airport Ref Point (ARP), geographical centre
		Pilot Controlled Lighting Freq.

Take Off and Alternate Minimums

Alternate Airport	On FPL only as on destination:	
	Ceiling < 2000ft	
	Visibility < 3 sm	
	1 Hour before / 1 Hour after ETA	
Standard Minimums	Precision Appr	600ft ceiling, 2 s.m.
	Non Precision	800ft ceiling, 2 s.m.

New Approach Chart (19/9/97)

Layout	Briefing Strips, Horizontal	
	Information left > right	Comms: ATIS/Appr/TWR/Grnd
		Approach: VOR/CRS/MDA/TDZE
		Missed Approach Instructions
		Required General Equipment
	Plan View	Unchanged
	Profile View	Unchanged
		Approach Lighting System
		Missed Approach Icons for Altitude/Navaid
	Minimums	Unchanged
	Airport Chart	Unchanged

Sector 7B

Approach Procedures

Straight In Landing	FAC must be within 30° of RW	
Straight In Approach	From Fix via DME (arc) or Vectors to FAC	
ATC Radar	Radar Vectors to FAC	
MVA:	Min Vectoring Altitude, Can be lower than MEA/MOCA	
	at least 300ft above highest obstacle	
RADAR Approaches	Airport Surveillance	At Airports with RADAR approach minimums
	ASR	Non Precision Approaches
		Vectors to FAC, distance, MDA, Altitude
		No weather watch
	Precision Approach	Glideslope Guidance
	PAR	No-Gyro Guidance (start/stop turns)
		(on FAC only 1/2 standard rate)

Aantekeningen Theorie IF

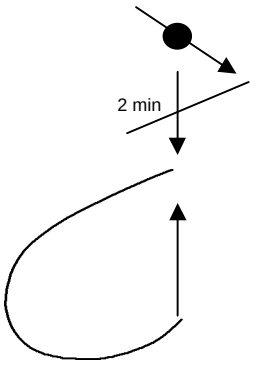
Course Reversal	Within 10Nm of primary Fix to FAC (max 200kias)	
	Procedure Turn / Teardrop Proc	
Timed Approach	From Holding Fix	
	Conditions	Control Tower is in operation
		Leave pattern at TIME
		Initial communication with Approach before TWR
		No missed approaches with PT
Final Approach	Whn no visual clues, not below MDA/DH (100ft above TDZE)	
	Non Precision: plan prior to MAP	
	Chart: Time to MAP at SPEED / MDA(HAT)	
Circling Approach	When IAC is not within 30° of RW	
	Unfavorable winds or sudden RW closure	
	Procedure according to TERP criteria (aircr appr cat)	
	RADII on chart for catagori in Nm at MDA	
Sidestep Maneuver	Parallel RW approach (<1200ft apart)	
Missed Approach	Due to	Low visibility
		Sudden runway closure
		Inadequate seperation by ATC
Visual Approach	Separation form IFR and VFR trafic	
	Visibility 3 sm, Ceiling 500ft above Min Vector Alt	
	Airport in Sight	
	Remain VFR	
Contact Approach	Expedite traffic procedures (shortcut)	
	On pilots request, own responsability, ATC Separation	
	Visibility 1 sm, Clear of Clouds	
	Airport has IAP	

Sector 8A

Instrument Approaches

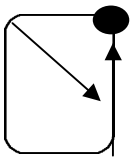
VOR + NDB Appoaches

Type	Non Precision	Off Airport Facility	IAF/FAF Navaid
		On Airport Facility	
VOR Approach	**Off Airport Facility**	MDA from 500-1000ft above TDZE	
		DME not always required	
	Procedure	Clearance by ATC	
		Preparing	Chart, AP Diagram, Missed Appr
		Descent to FAF	MEA > MOCA at DME distance or fix
		Outbound on Proc Turn	Cross VOR on OB Radial PT
			Intercept Radial 45°
			2 minutes to PT, 1 min to 180° turn
		Inbound to FAF	Landing checks, descent to VOR
			Report Position (CTAF)
		Final Appr Segment	Watch groundspeed
			Descent to MDA in TIME (at FAF/VOR)
		Missed Approach	Not below MDA until Visual References
			Remember 1st step (procedure)
	Procedure w/DME	Fly the ARC	
		Intercept radial inbound at Lead Radial	
VOR Approach	**On Airport Facility**	With DME fix	FAP = FAF (no defined FAF)
		Without DME fix	Overhead VOR at safe altitude
			Outbound > Turn Inbound, descent > MDA
	Procedure	Preparing	Via ATIS or UNICOM
			Identify VOR
			Fly to VOR > Outbound
		Clearance	VOR rw 2, maintain alt until outbound
		Descent to IAF	MEA > MOCA (MSA)
		Outbound on PT	Overhead VOR, rightturn to intercept IB radial
			Descent on OB radial, 2 min to PT
			PT (45°) 1 min then 180 turn
		Inbound Airport	On intercept crs for FAC to VOR on field
			Descent to MDA, watch descent rate
			MAP at TO/FR change
		Missed Approach	Climb to MOCA and fly procedure
	VOR/DME procedure	Stepdown fix	Defined by DME distances on QNH



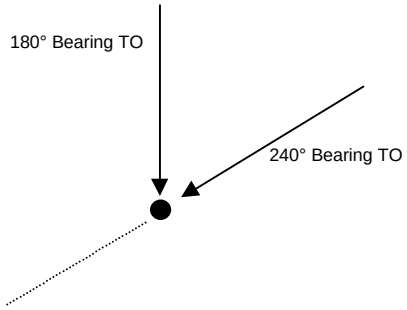
intercept angle 45°

leaving holding



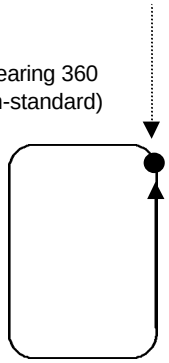
NDB Approach	Procedure	Preparing	Identify Primary Navaid as a LOM Check MOCA and MDA/TDZE VOR radial for Stepdown Fix (MOCA>MDA) Check Heading Indicator Check ATIS on IB
		Clearance	Cleared for NDB approach, contact TWR
		Inbound to FAF	Landing checklist before FAF At ADF needleswing > timed descent
		Final Appr Segment	Groundspeed to Time FAF>MAP (table) MDA > MAP, RW in sight?
		Missed Approach	Turn till ADF needle on the nose, direct to station

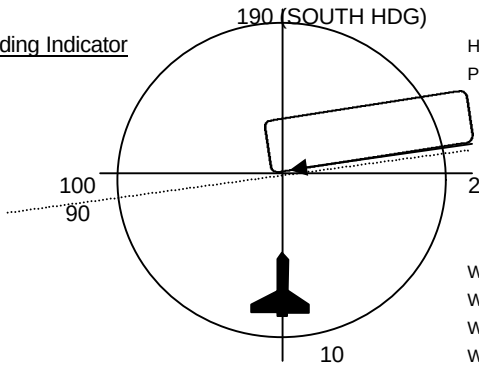
NDB Intercepts & Holdings



240 Bearing Inbound = 060 Radial Outbound

Hold South Bearing 360
Leftturns (non-standard)





Heading Indicator

Holding + Position Projection

North of Bearing 090 TO, Rightturns

Where am I
Where do they want me
Which Turns (left/right)
Which Entry

Quadrants (protected areas)

NW / Left	NE / Right
SW / Right	SE / Left

Sector 8B

ILS Approaches

Features	Precision Approach		
	Lower minimums		
	Landing on airports with no nonprecision possibilities		
ILS Catagories	Cat I		Instrument rated pilots only
			Proper equipment
		Minimums	RVR 2400ft, DH 200ft at HAT
	Cat II		Lower minimums
		Minimums	RVR 1200ft, DH 100ft at HAT
	Cat III		Special certification for pilots/aircraft/operators
		Minimums A	RVR 700ft
		B	RVR 150ft
		C	None
ILS Components	Localizer		Alignment with Front Course and Back Course (ATC auth)
			Span 10/10°, Service 10-18Nm
	Glideslope		Service 10Nm, 3° Angle, Freq 108.1 - 111.95 Mhz
	DME		Distance
	Marker Beacons		Integrated in path, MM/LOM
		OM	Glideslope Intercept, 4-7Nm before TRH (blue)
		MM	3500ft form TRH (amber)
		IM	Cat II = DH (white)
			LOM = Compas Locator Outer Marker, LMM (middle marker)
	Inoperative Components		Glideslope Out > Localizer Minimums
			Localizer Out > No ILS approach
			Minimums Increase (see table)

Straight-In (NoPT) ILS Approach

	Procedure	Preparing	Via IAF (VOR) > Localizer
			ATIS monitoring / Altimeter Reset
			Navaid: Loc + NDB or TWR
		Clearance	Cld for rw 18, maintain alt until established
		Descent prior FAC	From IAF > MOCA, checks
		Inbound to OM	Established ILS, Appr Speed, desc 480ft/m
		Final Appr Segment	Call TWR: IB on ILS approach
			Descent to DH

ILS Approach with Course Reversal

	Procedure	Preparing	From Intersection > IAF (MEA), contact UNICOM
			ADF/Localizer tuning
		Descent prior IAF	Inbound IAF
		Outbound on PT	IAF > Turn to intercept OB localizer (>MOCA)
		Inbound to LOM	180 Turn with 45° intercept
			Final Appr Course on Localizer
			Descent to DH

Type ILS Approaches	Parallel (dependent)	Parallel Runway (Centerline >2500ft apart)
		Seperation 1,5Nm Diagonally, RW 4300-9000ft apart > 2Nm
	Parallel (independent)	Dedicated controllers
		No staggerred separation
		NTZ, No Transgressing Zone between RW's
	Localizer Approach	When Glideslope is I/O
		Non Prcesion with LOC, descent to MDA
	Localizer Back Course	No Glideslope, be aware for GS signals from Front Course
		On VOR radial, reverse sensing, HSI > FC=BC

	LDA	Localizer Type Direction Aid Also in combination with GS, Width: 3-6° vertically Ident: Ixx (3-letter group) Final Appr segment of RW centerline > loc deviates 30° or more
	SDF	Simplified Directional Facility Width: 6-12° vertically, 35° horizontally Differs from LDA in LOC width No Glideslope

Radio Procedures (Practical)

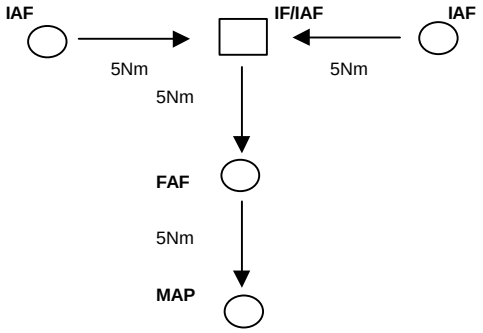
Inbound Airport	Ft Myers Approach Cessna 172 464TC 15 Nm south of Venice at 3000ft IFR to Ft Myers Pagefield Ready to Copy	Sq 0145, Cleared as Filed Via Radar Vectors Fly <Heading> at <Altitude>
Approach Clearance		Cessna 464TC Turn Left 080 Maintain 2000ft Until established on Localizer Cleared ILS 05 Contact Tower on <Freq>
On the Localizer LOM	Page Tower Cessna 464TC Established on Loc 05	Cleared for the option (Missed Appr / Touch and Go)
Missed Appr	Cessna 464TC on Missed Approach 05	
Air to Air Comm	On 122.75 and 122.95	

Sector 8C

GPS + RNAV Approaches

Approach Design — Basic T:

Routing aircraft to destination
Alignment with RW centerline
Straight-in procedure
Holding at IF/IAF



GPS Approach	Non-Precision		
	Types	Overlay	Phase 1, Existing Non-Precision approaches Phase 2, Using existing appr charts Phase 3, No conventional navigation (*or GPS*)
		Stand-Alone	Solely GPS approaches More efficient routing (basic T)
GPS Equipment Requirements			FAA appoved, TSO C-129, AC 20-138 RAIM, relability of GPS signal, 4 base + 1 integrity sattelite GPS RAIM availability from FSS wxbrief
VOR/DME RNAV			Computer determined position on nearby VORTAC's (FMS) Programmed point-to-point enroute/appr operations CLC > Course Line Computer, azimuth and distance to VORTAC (phantom VOR's) Approaches: specific charts, CLC programming

Sector 9A

Weather Factors

Atmosphere	50Km (160000ft) Thick	MSL	
		18000ft	50% of atmosperic mass
		53000ft	90% of atmosperic mass
		164000ft	99.9% of atmosperic mass
	Troposphere	SFC > 24000/50000ft	Decrease of temperature (Av 37000ft)
	Tropopause	Top	Abrupt Temp Lapse Rate (watervapor)
			Constant temperature
	Stratosphere	36000/160000ft	Top > Stratopause
	Stratopause	Top	Small Temp Changes
	Mesosphere	160000/280000ft	
	Thermosphere	280000ft+	

High Altitude Tropopause height is 24000 - 50000ft (at equator)
Between Troposphere and Stratosphere > Constant temp (-57°C), isolates airmass
Breaks, between polar and subtropical airmass (30-60° N)
and subtropical and tropical airmass (25° N) (in winter only)

Jetstream	60-240kts	
	Winter	Southern movement, Increased Strength
	Summer	Northern movement, Decreased Strength

Atmosp. Circulation	Uneven heating by Solar radiation in different angles and locations	
	North of Tropic of Cancer	Northern Hemispere (21 june)
	South of Tr of Capricorn	Southern Hemisphere (21 dec)

Pressure/Wind	Isobars / Pressure Gradient > change in pressure over distance	
	High	Center of high pressure, Ridge, area of high pressure
	Low	Center of hlow pressure, Trough, area of low pressure
	Col	Neutral zone between 2 highs and 2 lows
	Wind	Airflow from Cool/High to Warm/Low
	Coriolis Force	Deflect airflow to right (northern hem)
		By earths friction crossing wind over isobars
		Up to 2000ft, wind direction shifts

Moisture

Water	Solid (ice)	
	Liquid	
	Gaseous (vapor)	

Water added to air	Evaporation	Heated water > Gas (vapor)
	Sublimation	Ice > watervapor (no liquid state)
	Condensation	Vapor > Liquid (from saturated air (verzadigd))
	Deposition	Watervapor > Ice
	Precipitation	Condensed water in atmosphere (drizzle or Virga)
		Supercooled water, liquid below freezing level

Latent heat of Water To Vaporate 1 Gram of water takes 540 Calories

	Stability	Resistance to vertical motion in atmosphere
		Airparcel rising or sinking in relation to the air around it
	DALR	Dry Adiabatic Lapse Rate, 3°C/5.4°F per 1000ft
	SALR	Saturated Adiab. Lapse Rate, ( )
	Stability (DALR)	Air is Cold/Dry
	Instability (SALR)	Air is Warm/Moist (more watervapor)

	Ambient Air Lapse Rate	2°C/3.5°F per 1000ft	
Fronts	Passage inflight	Change of temperature Wind direction changes to right Pressure changes	
	Frontal Cyclone	Counter Clockwise in northern hemisphere Excessive temp gradient along Polarfront Orographic lifting in moutainous areas Starts with windshear and pressuredrop (wave cyclone) Cyclone deepens, increase winds around it (occluded)	
Turbulence in A/C	Light	Slight changes in Attitude/Altitude	
	Moderate	Variations in Airspeed	
	Severe	Abrupt changes in Attitude/Airspeed, moments out of control	
	Extreme	Impossible to Control, Structural Damage	
Thunderstorms	When Penetrating	Watch Instruments, no looking outside Don't change power Constant Attitude, Ride the Waves Don't turn back	
Microburst	Intense Downdraft 6000ft/min, both Sides 45kts Tail/Headwind, total at 90kts Maximum time is 15 minutes		
Icing	Reduces Lift with 30%, Increases Drag with 40% Freezing Rain indicates higher temps at higher altitude Frost is ice sublimed on surface with lower temp than dewpoint (=below freezing)		
	Rime Ice	Small droplets	
	Clear Ice	Bigger drops, Slow growth	
Windshear	Change in Wind Direction at Frontal Activity or with strong Temperature Inversions, at any Level		
	Warm Front	Before front, Below 5000ft for 6 hrs	
	Cold Front	Behind front, Below 5000ft for 3 hrs	
	Inflight	Tailwind to Headwind	Lower power then increase of power Pitch decrease and IAS increase

Sector 9D

Graphical Weather Products

Surface Analysis Chart Conditions in validated time on chart (3 hours)

Pressure patterns on surface (isobars)
Locations of highs and lows, fronts, temp, wind, vmc

Symbols	Round Station > human observation
	Square Station > Automated observation
	Pressure 147 > 1014.7 hPa
	Precipation .45 > 0,45 inch
	Temp/Dewpoint 44/42
	Wind Northwest 15kts >
	Clouds > Broken >

Weather Depiction Chrt General weather sky conditions from METAR (3 hours)

Symbols	Visibility in s.m. at Left (< 6 s.m.)
	Cloud Height > 100's of Feet AGL
	Cloud Coverage, Ceiling < 3000ft, X = Obscured Sky
	Weather Obstructions > snow etc
	Rain: .. = continuous, . = showers
	IFR Conditions: Shaded Areas, Ceiling < 1000ft, 3 s.m. Visibility

Radar Summary Chrt Collection of Radar weather reports (SD)
Precipitation: Intensity/size/trend/direction
No Cloud/Fog formations
Thunderstorms (T), Rain Shower (RW), Snow (SN), (+) increasing intensity

Contours	1st Line, Intensity 1-2, weak/moderate
	2nd Line, Intensity 3-4, strong/very strong
	3rd Line, Intensity 5-6, intense/extreme
Cloud Tops	In 100's of Feet MSL
Cloud Movements	5 / 10 / 50 kts (half-whole barb/pennant)

Satellite Weather Pict Photos with Temp/Hunidities/Wind/Watervapor
Visual and IR observations

Composite Moisture Stability Chart

Stability Panel	Areas of stable and unstable airmass
	Temp of lifted airparcel (negative = unstable)
	K-Index for temp/moisture level (<15 = no TS)
Freezing Level Panel	Upper Air freezing levels, BF = Surface freezing
Precipitation Water Pnl	Condensed Watervapor / Normal Values p. month
	Surface to 500mm level
Average Rel Humidity Pnl	Surface to 500mb level
	Air saturation
	Dark station symbol > 50%+

Constant Pressure Analysis Chart

Upper Air weather map
Daily at 1200Z and 0000Z, Surface to 850mb level (5000ft), upto 39000ft
Observed Temp/DP spread, Wind, Pressure, Clouds
Isotachs: Lines of equal wind velocity

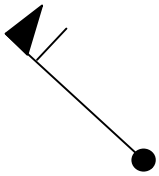
Observed Winds and Temp Aloft Chart

Planning: Cruise Altitude
Wind Direction and Temperature
Depicts winds at 8 levels, 6000/9000/12000/18000/ etc
Daily at 1200Z and 0000Z
Symbols: ● Station with DP spread < 5°C
○ Station with DP spread > 5°C

Level Winds Format

Wind 200° at 45kts, temperature -26°C
2045-26 (Temps interpreted Negative at >FL240)

Wind 160° at 115kts, temperature 34°C
16 + 50 = 66
115 - 100 = 15 > 661534



330° at 60 KTS

751041 = 250 at 110kts, -41
781842 = 280 at 118kts, -42
9900+00 = light/variable, < 5kts

Graphic Forecasts

Low Level Significant Weather Prognosis Chart

Planning: flight around low visibility areas
Surface to 400mb pressure level (24000ft)
Daily 4 times, 12/24 hours forecast

4 Panels
2 Upper Panels > Surface to 24000ft
2 Lower Panels > Surface Only
Significant Weather Pnl — Turbulence/Freezing levels, Thunderstorms
Surface Prog Panel — Pressure center movements, Precipitation

CB coverage
ISOL = 1/8
OCNL = 1/8 - 4/8
FRQ = 5/8 - 8/8

High Level Significant Weather Prognosis Chart

Above 400mb pressure level, up to 70mb (63000ft)
Displays thunderstorms, cyclones, squalls, turbulence, troppause height

Severe Weather Outlook Chart

Advanced Flightplanning, 48-hours outlook (24/48) at 1200Z
General and severe thunderstorm activity

Forecast Winds and Temp Aloft Chart

Daily at 0000Z and 1200Z, 12-hours forecast
Level 6000/9000/12000/18/24/30/34/39ft MSL

Tropopause Data Chart
Daily once at 1200Z
For High Altitude flight, vertical/horizontal windshear/turbulence

Tropopause Winds Panel — Streamlines: Parallel to Wind Direction (solid)
Isotachs: Wind Speed, (Dashed)
Tropopause Height / Vertical Windshear Panel
Trop Height in Pressure Altitude
Vertical Windshear in kts / 1000ft
Turbulance, moderate: at 6 kts or more

PIREP
Pilot (written) Report
OV / TM — Location / Time
FL / SK — Level / Cloud Layers
UA / UUA — Urgent

Others	HIWAS	Continuous broadcast over VOR´s of SIGMET/AIRMET
	AIRMET	For SE and VFR traffic, mod icing, turb, winds >30kts, vis IMC conditions, Issued HR + 15/45 1 hr validation
	SIGMET	All Aircraft, severse icing, turb, vis < 3 sm Issued as AIRMET, Convective for tornados/etc, H+55)

Sector 9E

Automated Surface Weather Reporting Systems

ASOS *Aut. Surface Observation System (METAR)*

Update: When significant change occurs
Installed/Operated by FAA
Frequency with computer synthesized voices (also by tel)

At TWR controlled AP	Level A	In B airspace
	Level B/C/D	Human observation

AWOS *Aut. Weather Observation System*

Update: 3 times per hour
At non-TWR airports
Also human observation

Types	A, Altimeter Setting only
	1, Including Temp/Wind information
	2, Including Visibility
	3, Including Cloud Information

Sector 10C

IFR Flight Planning

Flight Overview	Decision: Go or No-Go	Weather General via TV, Internet Performance of aircraft Equipment for IFR flight Available routes Instrument proficiency
Flight Planning	Route	Listed in Enroute section of Jeppesen Airway Manual Or Airport/Facility Directory (AF/D)
	SID and STAR	Jeppesen Approach Charts (or NOS) Departure/Arrival procedures Alternate airports on distance not affected by weather and with comparable instrument facilities
	Publications	NOTAM via Jeppesen Airway Manual or AIM
	Weather	General Overview before flight Occuring hazards Standard briefing at FSS or DUATS (Direct User Access Terminal System) RADAR and Sattelite Images Surface Analisys Chart Low Level Sign. Weather Prognosis Chart for VMC conditions and Freezing levels Weather Depiction Chart, simple VMC indication TAF/METAR of airports Forecast Winds Aloft
	Altitude Selection	MEA or designated by ATC according east/west direction Considerations: Wind/Icelevel/Turbulence/Cloudbase
	Navigation Log	Times (ETA, ATE (enroute), ATA Fuel planning
	Flightplan	Type Code: in Aeronautical Inf. Manual Filing: at FSS 30 min before departure time Closing: When landed at TWR AP (automatically) or in VFR condition enroute Non-TWR: at FSS or ATC Transponder: /U, including altitude Transponder: /A, including altitude + DME

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Section

IFR Decision Making

DECIDE Model	Detect a Change Estimate the need for action Choose the desired outcome Identify action to take Do the action Evaluate the effect

Section

Regulations

IR License	Less than min VFR conditions for a/c catagory All Class A airspace (18000-FL600) Passengers (hire) <50Nm at night prohibited (CPL) Passengers at night, cross country >50Nm (IR) Passengers at night (hire), cross country >50Nm (CPL/IR) IFR Flightplan		
IR Currency	Flight in IFR/IMC Conditions within 6 months with: > 6 Instrument Approaches/Intercepts/Holdings OR After 6 Months, with qualified Safety Pilot OR > 12 Months: IR Competency Check in an aircraft (rated) or approved trainer/sim		
For IFR Flights	Minimal VFR equipment: Airspeed / Attitude / Magn Compass / Tacho / Oiltemp / Oilpress / Fuel		
Plus extra:	Radio / Nav 2-Way Turn Indicator + Ball Directional Gyro Sensitive Altimeter Clock Alternator		
If necessary:	*Mode C Transponder (>10000ft, A-B-C)* *DME (>FL240)*		
Transponder C	Deviation in Controlled Airspace (B) Requests 1 Hour before flight		
Equipment Inspection	Altimeter / Transponder / Statics VOR Receivers		Every 24 months (end) Within 30 days
Inspection (Aircraft)	100hrs (Rental) Annual (General)		
Oxygen	Night General	>5000ft >12500ft after 30 min (crew) >14000ft for Flight Duration (crew) >15000ft after 30 min (occupants)	
Logbook	Simulated + actual IR Time, reference by instruments Instructor Time only in actual IMC		
Documents	Airworthiness / Registration / Radio / Operating Manual / W + B Airworthiness valid as long as Maintenance is performed		
IFR Chart Validation	56 Days		
Fuel Requirements	Time To Destination, To Alternate, + 45 Minutes		

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Section

Remarks

Latitude	Parallel to the Equator	
Longitude	Meridians from North to South Pole	
Night	1 hr after SS - 1 hr before SR	
Aircraft Catagories	Airplane SE/ME - SES/MES	
	Rotorcraft - Heli/Gyro	
	Glider	
	Lighter than Air - Airship/Balloon	
Aircraft Class	Complex aircraft	Retractable Gear, Controlles Pitch Prop
	High Performance	> 200 BHP
Rating required for	Aircraft > 12500 lbs	
	Turbojet	
	Other	

Section

FAA Written Test

Test Addendums

Legends	A/F Directory	Description Airport/Legends
		Abbreviations
		IAP Symbols and Chart Expanation

Rate of Climb Table, ft/Nm > ft/min
Approach Lighting System
Rate of Descent Table, ft/Nm > ft/min, Descent Angle (GS) > ft/min
En Route Chart Legend
Aircraft Equipment Suffixes (FPL)
Air Navigation Aids (VOR Service Volumes)

ETE Calculation

- All given Courses are Magnetic
- Find TAS/ALT/VAR/WIND in Flightplan

Calculate Magnetic Winds (East Variation = -xx)
Distances (from departure field to destination field)
Calculate Groundspeed per leg (pencildot on TAS)
Calculate legtimes

FROM	TO	CRS	NM	GS	ETE
A	B	x	x	x	x
B	C	x	x	x	x
C	D	x	x	x	x